

ABSTRACT

[065] Systems and methods are taught for blocking the propagation of electromagnetic waves in parallel-plate waveguide (PPW) structures. Periodic arrays of resonant vias are used to create broadband high frequency stop bands in the PPW, while permitting DC and low frequency waves to propagate. Particular embodiments include clusters of small vias that effectively function as one large via, thereby increasing stop band bandwidth and maximizing parallel plate capacitance. Cluster vias can be configured to additionally provide a shielded and impedance matched route within the interior area of the cluster through which signal vias can connect transmission lines disposed in planes lying above and below the PPW. Important applications include electromagnetic noise reduction in layered electronic devices such as circuit boards, ceramic modules, and semiconductor chips.